

THERE IS CLAIMED:

1. A method for extending one or more capabilities of a handheld device, comprising:
 - (a) said handheld device detecting a helper device that provides at least one resource;
 - (b) determining whether said helper device provides a selected one of said at least one resource, said selected one of said at least one resource being selected to extend said one or more capabilities of said handheld device, said handheld device being capable of independent operation and said helper device being configured to control access to the selected resource;
 - (c) said handheld device requesting the selected resource from said helper device;
 - (d) transferring data to said helper device from said handheld device in accordance with said helper device granting said handheld device access to the selected resource;
 - (e) said helper device using the selected resource to process the transferred data;
wherein the selected resource is not adequately provided by said independent operation of said handheld device, and
whereby said one or more capabilities of said handheld device are extended through the operation of the selected resource of said helper device.
2. The method for extending one or more capabilities of a handheld device of claim 1, wherein:
when said helper device denies said handheld device access to said resource, repeating step (a) with a different helper device.
3. The method for extending one or more capabilities of a handheld device of claim 1, further comprising:
 - (f) the operation of the selected resource on said data is controlled by said handheld device.
4. The method for extending one or more capabilities of a handheld device of claim 1, further comprising:
 - (f) said helper device sending an interface description to said handheld device;
 - (g) said handheld device constructing and displaying a control interface from said interface description;
 - (h) said handheld device transferring a processed user interaction with said control interface to said helper device, and
 - (i) said helper device interpreting the user interaction based on said selected resource;

wherein said handheld device operating said helper device based on said user interaction,
and

whereby new resources can be added or existing resources can be modified without requiring modifications on said handheld device.

5. The method for extending one or more capabilities of a handheld device of claim 1, further comprising:

(f) said helper device sending a status report of the operation of the selected resource on said data to said handheld device, and

(g) said handheld device taking action based on said status report.

6. A method for extending one or more capabilities of a handheld device, comprising:

(a) said handheld device detecting a plurality of helper devices that each provide at least one resource;

(b) determining whether any of said helper devices is capable of providing a selected one of said at least one resource to said handheld device, said selected one of said at least one resource being selected to extend said one or more capabilities of said handheld device, said handheld device being capable of independent operation and said helper devices being configured to control access to the selected resource;

(c) said handheld device requesting the selected resource from each of said helper devices that provide the selected resource, each of said helper devices queuing the request if said resource is temporarily unavailable;

(d) when the selected resource becomes available to one of said helper devices having queued the request, said one of said helper devices granting said handheld device access to said resource and ignoring all queued requests for said resource in other helper devices having queued the request;

(e) transferring data to said one of said helper devices from said handheld device in accordance with said one of said helper devices granting said handheld device access to the selected resource;

(f) said one of said helper devices using the selected resource to process said data;

wherein all requests for the selected resource, in other helper devices having queued the request from said handheld device, are ignored;

wherein the selected resource is not adequately provided by said independent operation of said handheld device, and

whereby said one or more capabilities of said handheld device are extended through the operation of the selected resource of said helper device.

7. The method for extending one or more capabilities of a handheld device of claim 6, wherein:

when a communication between said handheld device and said one of said helper devices of step (e) is broken before said handheld device has completed use of the selected resource, returning to step (a).

8. The method for extending one or more capabilities of a handheld device of claim 6, further comprising:

(g) the operation of the selected resource on said data is controlled by said handheld device.

9. The method for extending one or more capabilities of a handheld device of claim 6, further comprising:

(g) said one of said helper devices from step (e) sending an interface description to said handheld device;

(h) said handheld device constructing and displaying a control interface from said interface description;

(i) said handheld device processing a user interaction with said control interface, and

(j) said handheld device operating said one of said helper devices based on said user interaction.

10. The method for extending one or more capabilities of a handheld device of claim 6, further comprising:

(g) said one of said helper devices from step (e) sending a status report of the operation of the selected resource on said data to said handheld device, and

(h) said handheld device taking action based on said status report.

11. A system for extending one or more capabilities of a mobile device, comprising:

(a) a handheld device, said handheld being capable of independent operation;

(b) a plurality of helper devices, each of said helper devices providing at least one extension service;

wherein said handheld device communicates with each of said helper devices to determine whether any of said helper devices is capable of providing a selected one of said at

least one extension service to said handheld device, said helper devices being configured to control access to the selected extension service;

wherein said handheld device requests the selected extension service from each of said helper devices, each of said helper devices queuing the request if the selected extension service is temporarily unavailable;

when the selected extension service becomes available to one of said helper devices having queued the request, said one of said helper devices grants said handheld device access to the selected extension service and all queued requests for the selected extension service, in other helper devices having queued the request from said handheld device, are ignored;

wherein said handheld device transfers data to said one of said helper devices in accordance with said one of said helper devices granting said handheld device access to the selected extension service;

wherein said one of said helper devices uses the selected extension service to process said data;

wherein when each of said helper devices denies said handheld device access to the selected extension service, said handheld device terminates said communication with each of said helper devices;

wherein the selected extension service is not adequately provided by said independent operation of said first device, and

whereby said one or more capabilities of said handheld device is extended through the operation of the selected extension service of said helper device.

12. The system for extending one or more capabilities of a mobile device of claim 11, wherein:

the operation of the selected extension service on said data is controlled by said handheld device.

13. The system for extending one or more capabilities of a mobile device of claim 11, wherein:

said one of said helper devices sends an interface description to said handheld device;
said handheld device constructs and displays a control interface from said interface description;

said handheld device transfers a processed user interaction with said control interface to said one of said helper devices, and

said one of said helper devices interprets the user interaction based on the selected extension service;

wherein said handheld device operates said one of said helper devices based on said user interaction, and

whereby, new extension services can be added or existing extension services can be modified without requiring modifications on said handheld device.

14. The system for extending one or more capabilities of a mobile device of claim 13, wherein:

said interface description is specified in a markup language.

15. The system for extending one or more capabilities of a mobile device of claim 11, further comprising:

(c) a storage device for storing service information for said at least one extension service provided by each of said helper devices.

16. The system for extending one or more capabilities of a mobile device of claim 11, further comprising:

(c) an access database for storing authentication data associated with said handheld device, and

wherein said helper devices control access to the selected extension service using said authentication data.

17. The system for extending one or more capabilities of a mobile device of claim 11, wherein:

said data transferred from said handheld device consists of a URL.

18. The system for extending one or more capabilities of a mobile device of claim 11, wherein:

said data transferred from said handheld device includes one or more URLs.

19. The system for remotely accessing a resource of claim 11, wherein:

said handheld device includes a client for communicating with each of said helper devices, said client being activated on demand.

20. The system for remotely accessing a resource of claim 11, wherein:

said handheld device includes a client for communicating with each of said helper devices, said client running as a daemon.

21. The system for extending one or more capabilities of a mobile device of claim 11, wherein:

said one of said helper devices sends a status report of the operation of the selected extension service on said data to said handheld device, and

said handheld device takes action based on said status report.

22. A system for extending one or more capabilities of a handheld device, comprising:

(a) a first means for accessing at least one resource;

(b) a second means for controlling access to said at least one resource;

(c) a third means for communicating between said first means and said second means;

wherein said first means uses said third means to determine whether said second means is capable of providing a selected one of said at least one resource to said first means;

wherein said first means uses said third means to request said selected resource from said second means, said second means queuing the request if said selected resource is temporarily unavailable;

when said selected resource becomes available to said second means, said second means grants said first means access to said selected resource, and any other queued requests for said selected resource from said first means are ignored;

wherein said first means uses said third means to transfer data to said second means in accordance with said second means granting said first means access to said selected resource;

wherein said second means uses said selected resource to process said data;

wherein said first means is mobile and capable of independent operation;

wherein said selected resource is not adequately provided by said independent operation of said first means, and

whereby said one or more capabilities of said first means is extended through the operation of the selected resource of said second means.

23. The system for extending one or more capabilities of a handheld device of claim 22, wherein:

the operation of said resource on said data is controlled by said first means using said third means.

24. The system for extending one or more capabilities of a handheld device of claim 22, wherein:

said second means uses said third means to send an interface description to said first means;

said first means constructs and displays a control interface from said interface description;

said first means uses said third means to transfer a user interaction with said control interface to said second means, and

said second means interprets the user interaction based on said selected resource;

wherein said first means uses said third means to operate said second means based on said user interaction, and

whereby new resources can be added or existing resources can be modified without requiring modifications on said handheld device.

25. The system for extending one or more capabilities of a handheld device of claim 24, wherein:

said interface description is specified in a markup language.

26. The system for extending one or more capabilities of a handheld device of claim 24, wherein:

the request for said resource includes capability information associated with said first means, and

wherein said capability information is used by said second means to determine the appropriate interface description to send to said first means.

27. The system for extending one or more capabilities of a handheld device of claim 22, wherein:

the request for said resource from said first means includes the type of data to be transferred and the size of said data.

28. The system for extending one or more capabilities of a handheld device of claim 22, wherein:

said data transferred from said first means consists of a URL.

29. The system for extending one or more capabilities of a handheld device of claim 22, wherein:

said data transferred from said first means includes one or more URLs.

30. The system for extending one or more capabilities of a handheld device of claim 22, wherein:

said first means includes a client for accessing said at least one resource, said client being activated on demand.

31. The system for extending one or more capabilities of a handheld device of claim 22, wherein:

said first means includes a client for accessing said at least one resource, said client running as a daemon.

32. The system for extending one or more capabilities of a handheld device of claim 22, wherein:

said second means uses said third means to send a status report of the operation of said resource on said data to said first means, and

said first means takes action based on said status report.